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TO CORRESPONDENTS.

H. H.—I think it very undesirable to introduce the exhausted subject of snipes perching on rails, in the 'Zoologist;' it became intolerable in the 'Field,' the "Ayes" and "Noes" being equally positive and equally unconvincing.

J. R. W.—The subject is not of general interest: it is merely personal.

Darwin.—I hope to publish the Review of Mr. Darwin's work on the 'Origin of Species' in the July number.

The Rev. Mr. Gordon's List of the Names of Lepidoptera he had observed in Moray shall appear as soon as possible: it is not quite adapted to the pages of the 'Zoologist;' but, as a portion of the Fauna of Moray long since commenced, it seems entitled to a place.

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Notes on the Birds of Belgium. By Henry L. Saxby, Esq.

Not having access to any work upon the Ornithology of Belgium, I must confess that in at length bringing forward my own rough notes upon the birds of that country I do so with some misgiving, lest I may be falling into an error which it has always been my endeavour to avoid, one which must be too evident to the misguided few who, under the supposition that they have been exploring a region previously unknown to naturalists, have too hastily resorted to quill and foolscap, without due regard to the merits of those who have perhaps made the Natural History of that very spot the study of a lifetime.[a] With very few exceptions, these notes are the result of my wanderings in Belgium, and more particularly in South Brabant, in the years 1852-3. Several rare species having occurred only in the markets, I have placed an asterisk before their names, signifying their doubtful right to occupy a place in the following list.

Kestrel (*Falco tinnunculus*). Permanent.

Sparrowhawk (*F. nisus*). Permanent, but not so abundant as the preceding species.

Buzzard (*F. buteo*). Rarely seen. I have in my possession several eggs said to have been taken near Tirlemont.

Hen Harrier (*F. cyaneus*). Permanent ?

Ashcoloured Harrier (*F. cineraceus*). Rather scarce. About the end of May or the beginning of June it makes a nest of small sticks, wool and dry grass, gathered carelessly together upon the ground: the female usually lays four eggs, which are white and of a roundish form.

*Scops Eared Owl (*Strix Scops*). I saw one alive in the Brussels market on the 11th of April, and another a few weeks later. It is a very handsome bird, considerably less in size than the little owl, and far more lively. The first one soon died, but the other lived for thirteen days, feeding chiefly upon raw flesh. Upon one occasion I offered it some "blue-bottle" flies, which it eagerly swallowed: it also looked keenly at any which chanced to settle near the cage, but

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[a] I fear my correspondent has fallen into the very error he so justly condemns: has he not overlooked the very complete and elaborate List of the Birds of Belgium published by a resident naturalist, M. Julian Deby, in former volumes of the 'Zoologist.' See Zool. 813, 858, 933, 979, 1019, 1070, 1131, 1187, 1251, 1462 and 1528.—*E. N.*

I never observed it attempt to seize one. About noon it usually became very restless and irritable, ruffling its feathers, continually changing its position, and snapping smartly at any one who tried to handle it, though at other times such an act was not easily provoked.

Longeared Owl (*S. otus*). Permanent.

Shorteared Owl (*S. brachyotos*). I only saw it in spring and autumn, but it is said to remain to breed.

Barn Owl (*S. flammea*). Permanent and abundant.

Tawny Owl (*S. aluco*). Unfledged young were in the market as late as August.

Little Owl (*S. passerina*). Common. Between the months of March and October I seldom passed through the market without seeing several living specimens, often as many as a dozen at one time. The first eggs that I obtained were taken on the 15th of May, from a hole in a wall, about thirty feet from the ground. They were half-buried in a quantity of dust, composed of dry mortar and the castings of old birds. It sometimes rears two broods in a season, laying only two eggs each time. These are white, and in many instances nearly round: the texture of the shell is as coarse as that of an egg of much greater size. This bird is said to bear confinement tolerably well, but of those kept in cages I never saw more than five which lived as many months. They were fed upon raw flesh and small birds, and also upon mice when they could be procured. The manner in which it is employed as a decoy for small birds is still unknown to me, but I seldom saw a bird-catcher going out to his employment who was not carrying a little owl with him. Fresh specimens have the bill tipped with red, but this colour disappears as the skin dries.

*Tengmalm's Owl (*S. Tengmalmi*). I neve rsaw more than three, and they were brought to the market in April and May. No amount of care and attention could keep them alive; they soon died, although they took food readily. At a distance this bird may easily be mistaken for the little owl, which (so far at least as I can ascertain) it very much resembles in its habits.

Ashcoloured Shrike (*Lanius excubitor*). On the 13th of March I observed one lying dead at the bottom of its cage in the market-place opposite the Hotel de Ville. Upon dissection it proved to be a female. The stomach contained the remains of large beetles, thus proving the bird to have been very recently captured.

Redbacked Shrike (*L. collurio*). Summer. One nest in my possession is composed of the usual materials, but upon the outside there are great numbers of the skins of small hairy caterpillars: probably they had been cast up by the birds, only they were lying singly, and were pretty regularly distributed all round.

Woodchat Shrike (*L. rutilus*). A common summer visitor, arriving early in April, and taking its departure about the middle of September. For some weeks after its arrival it may frequently be seen near the outskirts of the Forest of Soignies, rapidly flitting from tree to tree, now and then alighting for a few seconds to pick up a large insect, and continually uttering a loud single note, not very unlike that of a chaffinch. Upon the approach of the breeding-season it retires further into the woods, where it builds its large and ill-concealed nest upon the branch of a tree, at the distance of some yards from the ground. On May 7th I discovered the first nest, which I frequently revisited until the young were fledged. Though rather large, it was neatly and compactly made of sticks, grass, wool and a few fibrous roots, and lined with fine grass intermixed with a large quantity of wool. The eggs were very similar to those of the redbacked shrike. Incubation continues for about sixteen days, during which period, but more especially in the early part of the morning, the male may occasionally be seen upon the eggs. I once observed a male constructing a second nest within a few feet of the one in which the female was sitting. The young, a little before they leave the nest, slightly remind one of young skylarks in colour, but at any distance they may be recognized by their white scapulars. I have never yet succeeded in discovering the remains of other birds near the nest of the woodchat, nor have I found anything but insects in its stomach; but that it really does occasionally kill and devour small birds has been satisfactorily proved by more careful observers than myself. My belief in this is strengthened by the fact of my having seen it fix small birds and pieces of meat between the wires of its cage, the more easily to be able to tear them, just as though it were well accustomed to the management of so large a prey. Woodchats being constantly exposed for sale in the markets, I had no difficulty in procuring specimens. Among eleven females examined by me there were no less than two in male plumage, the ovaries, &c., being, so far as could be ascertained, in their normal state. The plumage of one was precisely similar to that of an adult male, while that of the other only differed in the slight rusty tinge upon the sides and upon some of the outer tail-feathers. Such instances, however, are far from being of frequent occurrence, as several bird-stuffers have assured me. The remarks made by Yarrell (vol. i. p. 165) upon the changes of plumage in the redbacked shrike may perhaps be applied with equal truth to the woodchat.

Spotted Flycatcher (*Muscicapa grisola*). Summer. I have known it return to the same nest for two years in succession. The young of the first brood are able to fly early in July.

Pied Flycatcher (*M. atricapilla*). Arrives in April, remaining until the beginning of September. I found several nests, one of which was in an old decayed beech-log lying at the foot of a wall: the bottom of the nest was not more than eight inches from the ground. All the others were in small hollows in the trunks of trees, one being in the deserted nest of a woodpecker. The young are hatched in June, and when fledged are brought in large numbers to the markets. It is probably owing to the difficulty experienced in supplying them with their natural food that they so soon die when confined in cages. At all times they seem to be fond of finely-chopped raw meat.

Missel Thrush (*Turdus viscivorus*). Permanent, but rather scarce.

Fieldfare (*T. pilaris*). Winter.

Song Thrush (*T. musicus*). Permanent

Redwing (*T. iliacus*). Winter. I procured one specimen in which the back was nearly covered with large white spots.

Blackbird (*T. merula*). Permanent. Pied varieties are frequently to be seen in the shops.

Ring Ouzel (*T. torquatus*). Occasional. Three individuals obtained from the same shop had their stomachs distended with small shells, to all appearance a species of Clausilia.

Golden Oriole (*Oriolus galbula*). Summer. Said to be common in some seasons and scarce in others. Eggs were brought to me on the 23rd of May. The nest containing them was found in a tall birch tree in the Forest of Soignies, partly suspended from, and partly resting upon, the fork of a small branch. The outer part was made of wool, long grass and fibres of roots, the lining consisting of fine flowering heads of grasses; the sides were so firmly bound and twisted round the fork of the branch that the latter had to be cut away in order to avoid injury to the nest. In form the nest was rather wide, but scarcely so deep as the peculiarity of its situation would have led me to expect. The eggs were white, faintly tinged with pink, spotted, but rather sparingly, with dark purplish brown and reddish gray. It is probable that two broods are sometimes reared in a season, for I have seen unfledged young both in June and in August. The stomachs of recently-killed specimens contained small insects, and sometimes a few berries.

Hedgesparrow (*Sylvia modularis*). Permanent.

Robin Redbreast (*S. rubecula*). Common, but neither so familiar nor so abundant as in England.

Bluethroated Warbler (*S. suecica*). In private collections I have not only seen the bird itself, but also its nest and eggs, labelled as having been taken in Belgium. I never had the good fortune to meet with it in its wild state, although it is said to be a regular summer visitor.

Redstart (*S. phœnicurus*). Common. Summer.

Black Redstart (*S. tithys*). Occasional. In 1853 an English gentleman, then residing in Brussels, kindly presented me with the nest and eggs of this rare bird, taken by himself, in the summer of the previous year, near Etterbeck. The nest, which was not discovered until the bird was seen to fly out of it, was situated near the top of a large heap of old paving-stones by the road-side; it is rather loosely constructed of dead grass-stalks, moss and a few dead leaves, and lined with fine grass and horsehair. The eggs, four in number, are white and slightly glossed.

Whinchat (*S. rubetra*). Abundant in low meadows during summer. I remember seeing fresh eggs and well-fledged young within the same week.

Wheatear (*S. œnanthe*). Summer. Less numerous than the whinchat.

Grasshopper Warbler (*S. locustella*). In the collection of M. C. Dubois, of Brussels, I observed several specimens, and also a nest of young birds, all of which had been taken in South Brabant.

Sedge Warbler (*S. Phragmitis*). Summer.

Great Sedge Warbler (*S. turdoides*). By no means uncommon in summer, frequenting most seed-beds, canals and sides of rivers, where coarse herbage or low willows afford it sufficient cover. Referring to my note-books for 1853, I find the following entry: — "May 22nd. Walked along the banks of the canal in the direction of Vilvorde. While stooping to pick up an insect my attention was suddenly attracted by the loud notes of some unknown bird close beside me, and immediately afterwards I caught a glimpse of the bird which was uttering them, and which I rightly conjectured to be a 'reed thrush.' It would not take wing, but continued dodging and hiding among the reeds in a most amusing manner, at frequent intervals making known its whereabouts by its harsh, scolding notes, not a little like those of the whitethroat, only of course much louder. Suspecting that the nest must be somewhere near, I continued to turn aside the reeds with a fishing-rod, until my trouble was rewarded by the sight of a nest, though to all appearance an old one, far out of reach. Accompanied by L——, I hastened with all speed to the ferry; and having procured the assistance of the boatman, we soon had the satisfaction of taking our first reed thrush's nest. Though having a somewhat weather-beaten and untidy appearance, it was nevertheless a new one, and contained three eggs. It was firmly built round the stems of the reeds, and was composed of dry leaves of the reeds themselves, which gradually became smaller towards the inside, where a few blades of grass were neatly interwoven. Its shape was narrow and deep, and altogether it had much the appearance of the nest of a reed wren, but it was much larger and less carefully constructed." The eggs differ considerably in size and colour: in my own collection I have the following varieties:—

1. Dull white, faintly tinged with green, blotched and spotted with light brown and dark greenish brown, some specimens with and others without a few bluish gray spots.
2. Resembling the above in colour, but with the marks very much smaller, and more uniformly distributed.
3. Clear bright greenish blue, with large spots of very dark brown and bluish gray.
4. Bluish green, with a few faint gray marks near the small end.

Eggs from the same nest seldom differ much in colour. Other particulars relating to this bird having already been described by Mr. Hancock, a mere repetition of them here would be superfluous.

Reed Wren (*S. arundinacea*). Summer visitor.

Nightingale (*S. Philomela*). Ditto.

Blackcap (*S. atricapilla*). Ditto.

Garden Warbler (*S. hortensis*). Summer. Early in August I saw a brood of unfledged young, in all probability a second brood. They were constantly supplied with flies and small caterpillars, of which the parent birds collected a large store, in a kind of pouch below the bill, before returning to the nest. The flies were taken upon the wing, the birds darting from the bush in which they were sitting, and never failing to secure one at every attempt. Towards the close of the breeding-season garden warblers, both old and young, were brought almost daily to the markets.

Whitethroat (*S. cinerea*). Arrives about the end of April, and pairs almost immediately afterwards. I found a nest nearly twice the usual size, composed entirely of hay, of which there happened to be a large quantity in the ditch beneath.

Lesser Whitethroat (*S. curruca*). Summer.

Wood Wren (*S. sylvicola*). Ditto.

Willow Wren (*S. trochilus*). Ditto.

Chiffchaff (*S. rufa*). Ditto.

Sylvia ———? A species previously unknown to me, appearing about the same time as the wood wren, to which it is somewhat similar in size and plumage, but not so brightly coloured, particularly upon the back and wings, which are rather of a brownish hue: the tail is slightly forked, and the yellow stripe reaches only from the bill to the eye, instead of extending above the latter. At first I imagined it to be a wood wren in immature plumage, although the bird-catchers endeavoured to persuade me that it was a distinct species, and even promised to bring me its eggs. When they did so shortly afterwards, I was still in doubt; for instead of the nest being like that of a wood wren, to which the bird must be very closely allied, it was shaped like a whitethroat's, and was even made of nearly similar materials, the only difference being that it was more substantially built, and had a little moss in the lining. The eggs were also about the size of those of a wood wren, and were spotted, though less plentifully, with dark brownish red; but the ground colour, instead of being white, was very decidedly pink. At length, after having received other nests, and examined several specimens of the bird itself, I became convinced that no deception had been practised, and that it was really a separate species. Probably it may already be a well-known bird, and if so perhaps some kind reader of the 'Zoologist' will set my doubt at rest for ever, that is, of course supposing the above description to be intelligible to any one besides myself.

HENRY L. SAXBY.

Balta Sound, Shetland,
April 24, 1861.

(To be continued).

Death of "Dr. Brooks," the Old Griffon Vulture, at the Zoological Gardens.—Last week, at the Zoological Gardens, died, apparently from sheer old age, a griffon vulture, which for upwards of thirty-three years had been an interesting ornament to the collection. This bird was presented to the Society in 1828 by Dr. Brooks, and is said to have been by no means young when it came into that gentleman's possession. "Dr. Brooks," as the vulture was popularly called, in spite of her being of the gentler sex, and having laid eggs at various times, might have been distinguished of late years from her companions by the lighter colour of her plumage and the faded appearance of her beak. The garb and staid demeanour of old age were gradually assumed, and, as time wore on, appetite began to fail (a bad sign when vultures are concerned), until at last even the kind attentions of her keeper ceased to rouse her failing powers, and death released her from her long captivity. This vulture was the oldest inhabitant of the gardens, and the last survivor of the original zoological collection. Griffons are now well known to most persons, and many fine specimens have lived and died in the menagerie since this one first appeared on the scene, but "Dr. Brooks" has doubtless been useful in her generation, and deserves a passing notice now at the close of her career.—*E. W. H. Holdsworth, in the 'Field,' May* 11, 1861.

Occurrence of the Kite near Barnstaple.—I have to record the capture of a fine adult specimen of the kite, in a trap, at Kentisbury, a few miles from here, a few days since. The kite has been for many years unknown in this county. During his long experience of the Ornithology of Devonshire, Colonel Montagu never met with a specimen; the occurrence, therefore, of so rare a visitor in this neighbourhood is a matter of some interest.—*Murray A. Mathew; Raleigh, near Barnstaple, May* 5, 1861.

Eggs of the Dipper and Missel Thrush.—In your article upon Birds' Eggs (Zool. 7398), you put down the eggs of the dipper as 5; as far as my experience goes I have oftener found the eggs to be four than five, and in one instance found a nest containing only three young ones. I have also known the missel thrush in several instances to sit upon three eggs only.—*John P. Thomasson; Bolton, March* 21, 1861.

Nest of the Longtailed Titmouse.—In your "Observations on the Nests and Eggs of British Birds," mention is made of the longtailed titmouse. I merely beg to say that I have known of dozens of their nests, but never found one with two holes; many years ago, however, I took a nest late one evening, and three old birds were in the nest on the eggs, two females and one male; a similar case I never heard of. A friend of mine, Mr. Thomas Thompson, of Winlaton, once took a nest with both the old birds on the eggs. Two years ago Mr. Thompson also took a nest in Gibside Wood, near this place, which had two distinct holes, and it is now in his possession. This is the only one I have ever seen. I believe Mr. Hewitson in his book speaks of having once seen one with two holes. No swallows have been seen in this neighbourhood this season. Redstarts, willow wrens, wood wrens, grasshopper warblers, chiffchaffs and tree pipits have arrived.—*Thomas Robson; Swallwell Iron Works, near Gateshead-on-Tyne, April* 23, 1861.

Variety of the Common Partridge.—In the thirty-fourth volume of the 'Naturalist's Library,' Sir W. Jardine states, under the common partridge, that he had procured a specimen from Mr. Fenton, in Edinburgh, which he thus describes. "Above of a brown tint, deeper than usual, but with the ordinary markings; the ground colour of the breast and under parts is of the uniform gray, which covers the breast in the ordinary state of the bird, having the black wavy markings, but there is not the slightest trace of broader marking to the feathers, or of the horse-shoe which prevails in other states, and to a certain extent, even in the female: the head, neck and patch on the throat are umber-brown, and around the bill, mouth and eyes is nearly pure black; the bill itself is of a darker colour than usual." No other writer seems to have noticed this singular variety, and I now draw attention to it, as similar birds have been killed in this county during the last three seasons. In December, 1860, two beautiful specimens were brought to me by one of the "unlicensed" sportsmen of the parish. He said that there were several more in the neighbourhood, and that he could easily distinguish them when on the wing from birds in the ordinary plumage. One had been shot a few weeks before, and fortunately preserved. In the previous season another "unlicensed" had come upon a covey feeding, and could not at first make them out, but he soon settled his doubts by killing two of them, which were dispatched to a small market town in the district, from which Plymouth is supplied with game, &c. A gentleman at the latter place purchased in 1859 a specimen of this variety, and I look upon it as probable that it was one of the two birds referred to. In the previous year Captain Morshead, of Stoke, near Plymouth, obtained a specimen from the same poulterer. This bird I have seen, and it closely resembles in plumage my two birds. Here then we have proofs that all the birds of a certain covey similarly diverged in marking from the ordinary plumage of the common partridge, and that moulting did not destroy in the slightest degree this variation. One is almost tempted to dismiss the idea of "variety," and introduce that of "hybridity" as an explanation of the cause of this peculiar condition of plumage, but I am at a loss on whom to fix the parentage in connection with the common partridge. We have no redlegged partridges in this part of the county, otherwise a relationship might be detected in the black feathers around the bill and in the regions of the eye, combined with the absence of the horse-shoe marking on the lower breast. But even then there would be nothing in the form to lead to such a supposition, the variety being decidedly in shape a common partridge. I have premised that the specimens here recorded are identical with the Edinburgh bird, but I should remark that in addition to the black wavy markings on the gray ground of the breast there are light-coloured chestnut bands, one or more on each feather, occupying the whole space between the wavy markings, which would otherwise have been gray. My friend, Mr. J. Gatcombe, in describing in the 'Field' the specimens preserved at Plymouth, speaks of them as appearing to have been exposed to a red wash, a description which admirably applies to at least one of my specimens. A few of the flank feathers have the dark chestnut markings of the common bird. I should add that the man who detected the covey on the ground, and who killed two of them, said that the black around the bill was of a dark green when fresh. Are any of the correspondents of the 'Zoologist' conversant with this variety, which perhaps may not be uncommon in some localities? —*W. S. Hore; Shebbear Vicarage, Devon, May* 2, 1861.

Hybrid between the Blackcock and Common Pheasant.—At the sale of the ornithological collection of the late Mr. Cornelius Tripe, of Devonport, I purchased a hybrid between the blackcock and pheasant, which had been obtained in the market of that town some ten or twelve years ago. It is a male in fine plumage, although in a slight state of moult about the neck. In 1839 I secured one of these hybrids, which had been killed in Cornwall, and which is recorded in Yarrell's 'British Birds.' The figure of Lord Howick's hybrid in the same work is a correct representation of this bird. In size, shape, feathering of the tarsi, form of the tail and general appearance my two birds agree, with the exception that the feathers of the neck in the recently purchased bird are of a straw-coloured white, with two short blackish lines, one on each side, running down from the darker feathers of the head. Some few of the feathers on the lower part of the breast have also the markings of the pheasant, though of a white colour. Yarrell mentions thirteen specimens of this hybrid, and I have no doubt that several more are to be found in the many collections (large and small) scattered throughout the country. Notices of them, I feel assured, would be acceptable to the pages of the 'Zoologist,' as they are of interest not only to the ornithologist but also to the sportsman, and it is in order to elicit communications of this description that I am induced to send the present remarks. Many years since I saw a female hybrid of this kind in a very good collection of birds made by the Rev. T. Johnes, of Bradstone Rectory, near Tavistock; it was much smaller than my specimens.—*Id.*

Ostrich-Hunting in Northern Africa.—To enter upon a full history of "the pride of the Desert" would be out of place here, especially if the tales of the Arabs were incorporated in its annals. Unfortunately there is but little opportunity for testing from personal observation the truth of the characteristics attributed to the ostrich by the natives, who ascribe to it a strange mixture of sagacity and simplicity. The capture of the ostrich is the greatest feat of hunting to which the Arab sportsman aspires, and in richness of booty it ranks next to the plunder of a caravan. But such prizes are not to be obtained without cost and toil, and it is generally estimated that the capture of an ostrich or two must be at the sacrifice of the lives of two horses; so wary is the bird and so open are the vast plains over which it roams that no ambuscades or artifices can be employed, and the vulgar resource of dogged perseverance is the only mode of pursuit. The horses to be employed undergo a long and painful training, abstinence from water and a diet of dry dates being considered the best means for strengthening their wind. The hunters set forth with small skins of water strapped under their horses' bellies, and a scanty allowance of food for four or five days distributed judiciously about their saddles. The ostrich generally lives in companies of from four to six individuals, which do not appear to be in the habit, under ordinary circumstances, of wandering more than twenty or thirty miles from their head-quarters. When descried, two or three of the hunters follow the herd at a gentle gallop, endeavouring only to keep the birds in sight without alarming them or driving them at full speed, when they would soon be lost to view. The rest of the pursuers leisurely proceed in a direction at right angles to the course which the ostriches have taken, knowing by experience their habit of running in a circle. Posted on the best look-out they can find, they await for hours the anticipated route of the game, calculating upon intersecting their path. If fortunate enough to detect them, the relay sets upon the now exhausted flock, and frequently succeeds in running one or two down, though a horse or two generally falls exhausted in the pursuit. The ostrich when overtaken offers no resistance beyond kicking out sideways. A skin in full plumage is worth on the spot from forty to one hundred Spanish dollars, but the Arabs are in the habit of judiciously thinning the feathers, so that the trade can rarely obtain a specimen on which this tax has not been paid. I have frequently seen the ostrich domesticated without being in captivity. The Bey of Tuggurt kept several in a large court-yard, where they had free egress and ingress, but they showed no inclination to escape. They lived in very good fellowship with the numerous horses, asses and camels of the establishment, but had an admitted precedence, and would stretch their long necks over the shoulders of any of their companions, and select corn or dates from the nosebag. If any spirited colt or grumbling camel showed an inclination to resist, a side kick in the ribs very soon brought him to submission. To strange horses they exhibited a decided aversion, and would walk quietly alongside one, and then suddenly strike out with one leg at right angles to their bodies, a most clumsy-looking but a very effective mode of attack. I remember seeing another, apparently public property, in the market of Jamerna, who would go round and levy willing contributions from the vendors of dates and barley, and who slept at night (I suppose I must not say roosted) in the open square. But he presented a very beggarly appearance; for in return for the alms he received he had yielded to his caterers every feather in his body. Once, and once only, had I the good fortune to take an ostrich's nest, though fresh eggs were frequently brought in by the Arabs. There is something irresistible to the Nomad in the charm of an ostrich-chase, and, as often as our exhausted horses had suffered from the vain pursuit, it was almost impossible to hold in our servants, when the alarm was given, from wildly galloping over the plain. On this occasion, however, we had observed with our telescopes two birds standing for some time in one spot, and were induced to ride towards them. By great good fortune we detected their track as we crossed it, for the stride of the ostrich often measuring when at full speed from twenty-two to twenty-eight feet, and there being simply the round impression of his two toes, it is very difficult to discover its course. We traced these steps back to the spot where we had seen the birds standing, and where the sand was well trodden down. Two Arabs at once dismounting began to dig with their hands, and presently brought up four fine fresh eggs from a depth of about a foot under the warm sand. I may remark that the egg of the North African ostrich seems to differ decidedly from that of the Cape bird; I have seen hundreds of specimens, and always found them rather larger than the southern eggs which we generally see in England, and quite smooth, with an ivory polished surface, and free from any punctures. Until I found the eggs myself, I was under the impression that they might be polished by the Arabs, but this is a mistake. The eggs are applied to various uses by the natives, chiefly as ornaments for their tents, drinking-cups and work-boxes, but above all for the embellishment of the mosques, where long rows are suspended from the arches or rafters, and of the burying-grounds, where each grave, especially at Waregla and Ngoussa, is decorated with an ostrich-egg set in mortar at the head and at the foot, the shieks being honoured with from twelve to twenty each, sometimes planted all round the grave, sometimes built into a pyramidal shape at the head. The ostrich appears to lay from the beginning of December to March,—at least fresh eggs are to be obtained throughout that period; but I was unable to ascertain either the time of incubation or the number of the brood, as no dependance can be placed on the Arab stories on these points. From all I could learn the number of eggs is not less than twelve, and the young are generally hatched about the end of February. The hunters all agree that though the parent bird covers the eggs with sand during the day she incubates them herself at night, and that her mate remains in attendance by her.—*H. B. Tristram in* '*Ibis,*' ii. 72.

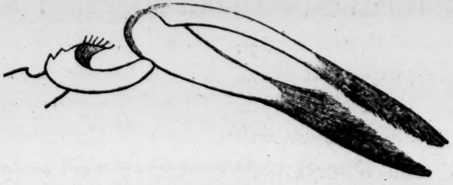
Does the Kittiwake Breed in the Isle of Wight. In a late number (Zool. 7500), is the following statement about the kittiwake: "At Fowl's Heugh they are said to breed in vast numbers, but never in the Isle of Wight, as Mr. Yarrell supposed." In his 'History of British Birds' (iii. 445), Mr. Yarrell says, respecting the above bird, "This gull is decidedly a rock-breeder, and very common in the breeding season on all the rocky parts of the coast of Hampshire, Dorsetshire, Devonshire and part of Cornwall. I have seen hundreds in one day in the first week in June, between the Needle Rocks and Freshwater Gate in the Isle of Wight;" and in a note at p. 446 Mr. Yarrell says that kittiwakes breed every year on the cliffs of the Isle of Wight in great numbers. Those who think that the mere statement in the 'Zoologist,' given without any evidence in support of it, supersedes the authority of such an ornithologist as the late Mr. Yarrell was, must believe one of two things, either that Mr. Yarrell did not know the kittiwake when he saw it, or that those birds frequented the Freshwater cliffs in hundreds, early in June, not for the purpose of breeding. I believe that few persons, who, like myself, have been in the habit of studying Yarrell for years, testing his accuracy by their own observations and experience, will think that his statements (especially where grounded on his own personal observations) are to be got rid of by any but the strongest and most unimpeachable evidence. One of his illustrations of the kittiwake, Mr. Yarrell says, was taken from an adult bird killed at the Isle of Wight early in June. It is possible that the kittiwake may not now breed on the Freshwater cliffs, exposed as they are to constant persecution every breeding season, but I have no doubt that they did twenty years ago (my edition of the 'British Birds' was published in 1843), as Mr. Yarrell states. On referring to my notes of a visit paid to the Freshwater cliffs in May, 1850, I find recorded my belief that the gulls then frequenting the cliffs were the lesser blackbacked, the herring and the kittiwake. I had not the means for a close inspection. The kittiwake is, at least was, a very few years ago, one of the commonest of the gulls frequenting our southern coast, and from its much smaller size could hardly be mistaken for one of the other three very common species, the lesser blackbacked, the herring and the common gull, by any ornithological observer.—*Henry Hussey; 7, Hyde Park Square, May* 3, 1861.

[Of course I am perfectly aware of all that my late friend Mr. Yarrell wrote on this subject, but the question is simply one of fact. The Rev. C. A. Bury, Mr. A. G. More, Mr. Bond and Mr. Henry Rogers are the ornithologists *par excellence* of the Isle of Wight; I appeal to either or all of them, and shall be delighted to record their verdict in the 'Zoologist.' From their verdict there is certainly no appeal.—*Edward Newman.*]

The Crab and its Allies. By C. Spence Bate, Esq., F.L.S., &c.

(Continued from p. 6691).

In catching and securing their young and food, most Crustacea make use of claws that are developed into a finger-and-thumb-like hand. These hands are generally formed by a process of the penultimate articulation produced to a considerable extent; this is impinged against at its apex by the extremity of the last joint or finger. But the form and character of these useful organs are extremely variable in shape, size and importance. In some they are simply legs, and do not exist in the form of chelæ, as in Mysis and many Isopods: in others they are the result of the finger, or last joint, falling back upon the preceding, which is more or less developed; such we find in the common shrimp, in most of the Amphipods, and the genus Squilla among the Stomapods. In some the finger is formed of the ultimate and the antagonizing thumb of the antepenultimate joint, as in Leucothoë, or even the joint preceding that, as in Oara; these general forms again vary in detail of greater or less importance, and in the genus Atoida both finger and thumb terminate in a brush of a



very plumose character; a somewhat analogous example may be found on our own shores in the genus Calissoma, among the Amphipods, where the terminal nail or point is broken up into fine hairs.

The habits of those Crustacea which have feathered chelæ are not known, but the common soldier crab of our shores has the posterior pair of feet, though not developed into a plumose brush, yet so plentifully covered with hairs as to become an efficient brush; with this brush the animal cleans and mops out the branchial chamber and the many joints and crevices of his body; stopping now and again to wipe this brush in the Gnathopoda with the greatest care. This little brush is also formed as a claw, with which he pulls off any extraneous matter that the softer brush cannot remove. I never thought of it before, perhaps he scratches himself with it also. I wonder if a crab ever felt the sensation of tickling? Upon the softer portion of the body the soldier crab is very sensitive, and always keeps it enclosed within a shell of a mollusk, to preclude it from rough accidents. The way that I generally get them to come out of these shells, without roughhandling, is by pricking them through a hole in the apex of the shell in which they dwell. Then to see their look of surprise as they hurry out! but I must not forestall. The claws of the crab and lobster are not the same as those developed as such in the Amphipods and other Crustacea.

I should premise that a Crustacean is divided into three parts—the head (cephalon), the body (pereion), and the tail (pleon). To the pereion there are always seven pairs of limbs. In the higher forms the two first are developed as to belong to the mouth, and, therefore, in the crab and lobster we find the third pair in position become the hands, whereas in Squilla and in the Amphipods they are formed of those which are only appendages to the mouth in the crab; thus there appears a uniform law in Crustacea that the lower the type the more limbs are developed upon the simple form of the true leg,—a law that is consistent with the internal structure, since we find the nervous system more distinctly marked by separate ganglea.

I stated a short time back that, in order to relieve itself, a crab will run away and leave one of his limbs behind. This is a piece of economy in the habits of the animal common to most Articulata, as well as others even of a higher order; the legs of young frogs will, upon being removed, be again reproduced; but nowhere is the power so forcibly exemplified as in the Crustacea.

I kept some crabs for some time in order to experiment upon these powers of loss and reproduction, and found that amputation in the limb thrown off invariably takes place at a particular joint, between the basos (second) and the ischium (third); the second in the crab, but in the lobster it is the third,—the coxa or first joint, which is fused with the body of the animal in the former, being free in the latter.

When any limb is injured the animal appears to suffer pain, holds its legs free from contact with anything, and runs from the neighbourhood of the catastrophe. In an instant it violently strikes the limb against some hard substance, and forthwith appears free from its great care; the limb instantly drops off, and to all appearance the crab has already forgotten that he ever had one, so contentedly he proceeds to enjoy himself.

The wound caused by the removal of the limb is rapidly skinned over, so rapidly as to appear to have been an act simultaneous with the amputation. It is not impossible that the development of this membrane may be the amputating force.

No animal will part with its limbs for slight causes, although the pain may be severe. I once cut the hand of a crab through the thumb and finger with a pair of scissors; it never threw off the limb, although it evidently suffered much; the poor thing would gently stroke the wounded arm with the other hand, and, as clearly as Sterne's ass, told its suffering. It smites upon the feelings, even through the enthusiasm of a naturalist who experiments from a love of truth, to see the weakest creature suffer, particularly if any animal has been kept for some time, and has a claim upon his kindness from its helplessness; and many is the time I have asked others to kill an animal, that I might not behold the stroke that made it cease to live, or put them to sleep with chloroform so that they might not know when they ceased to be among the living.

It is astonishing to see with what instinct the crabs appeared to escape the cutting of the scissors; I have often dodged about for some time trying to catch one of their claws between the blades, and often, when I seemed to have got one there, it would slip away before the blades came together. It was in one of these mutilating chases that occurred the case above alluded to, in which I missed the arm and caught the fingers only before the active fellow could get out of the way. The hand never grew again, and even after the animal had shed the exuviæ it continued a maimed appendage.

Shortly after a limb is thrown off, in the centre of the wounded stump, within the enclosing membrane, the new organ commences its development. A small papilla becomes visible and goes on increasing behind the membrane, causing it to protrude more and more as its own growth increases; but the membrane never breaks, for the new limb is part of a new animal within, and has little or no connexion with the old shell; within the membrane the limb lies bent up and passive until the period arrives that frees it from its position, when it appears as part of the new animal, and is in size greater or less, according to the length of the time that has elapsed since the loss of the old limb. In this condition, either large or small, it continues, as the rest of the animal, stationary in growth, until the next period of shedding the exuviæ, when it will be found to have advanced in size equal to its proportion relative to the animal.

Naturalists have generally assumed that this power on the part of these hard-skinned animals was given them in order that they might have, within their own means, the capability of overcoming the disastrous results of an injury; for, otherwise, a limb having been lacerated or torn off the animal, enclosed as it is within a most unyielding tissue, must of necessity bleed to death.

In all the natural sciences there is nothing more likely to lead to error than deductions based upon negative evidence. That an animal might bleed to death under such circumstances appeared a most probable hypothesis; but investigation among the lower forms proves that the Amphipods have not the power to throw off their limb on the receipt of an injury; and in the higher forms, also immediately after moulting, the limb is not rejected for half an hour or more while the external tissue is soft. If a leg in an Amphipod be broken off, the wound appears shortly after to cicatrize over with a black scar; but, so far as opportunity has enabled a judgment to be formed, the part is never thrown off. A limb upon being lost is capable of being reproduced, but the injured limb is not thrown off at the time that the injury is received, but probably at the period when the whole of the dermal tissue is exuviated; the new limb commences at that or some earlier period still, and continues its growth after the manner of the preceding.

The exhibition of indifference in these creatures to the loss of one or more limbs is an argument made use of by philosophers to prove that animals that have no true brain cannot suffer pain; that the writhings, like those of the worm upon the fisherman's hook, are the result of a reflex action only. I am not one of those who think that we ought not to inflict suffering upon the lower forms of life, if there be sufficient reason for doing so. To obtain knowledge of a single undiscovered truth is of more value to man than the existence of myriads of small worms. But it is not on this account that I can blind my eyes to the demonstrative fact, that much of the contortions set up by these creatures can be accounted for upon no other hypothesis than that of suffering. It is true that a crab appears happy enough when its leg is off, but I have no doubt that it was suffering that instinctively made him get rid of it. We know that, in the human frame, upon the removal of an injured or diseased part the pain is considerably reduced, if not wholly removed, as is demonstrated by the extraction of an aching tooth: this is a forcible and not a voluntary act, as in the Crustacea.

There can be little doubt that the amount of pain which these creatures feel is very little, in fact, on a par with their consciousness in respect to their senses generally; but we can hardly believe that a limb is thrown off but from an instinctive feeling to relieve pain. It is true that they are stated to throw off their limbs at the report of cannon or the sound of thunder, and Mr. Gosse tells us that fishermen often experience that, upon catching hold of a lobster in his den, it retires further within the secure recesses, and leaves a claw in his hand. There can be little doubt that this last is the result of fear, an act instinctive of self-preservation. With regard to the former it can only be accounted for as the result of terror, but the cases, as stated by Mr. Bell, are such as to induce us to think that it may have been the result of other causes. In a passage in a thunder-storm across the North Sea, the tossing of the ship and rough usage must have a deteriorative influence upon confined and half-dead lobsters, sufficient to account for the phenomenon without attributing it to the influence of the thunder.

In the habits of these creatures there is another feature which, though it may be more or less common to other tribes, has here arrived at its culminating point. The removal of the external dermal tissue appears an universal law in creation; in some it may remain attached as a perennial epidermis that may thicken upon the surface as a protecting medium; in others it is brushed away in small but constant quantities; again it is removed as an entire covering, but in no class of animals do we find it so perfectly removed as in the Crustacea.

In reptiles the skin is torn off as a whole. The toad is said to do it by drawing it bit by bit into its mouth, and then spitting it out as a ball; from the frog it strips off as a thin membrane, almost invisible in its transparency, and floats away in the water; but in Crustacea it becomes a more important transaction in its life,—it is a condition of growth, and is obliged to be repeated with constant regularity to admit of the enlargement of the animal. When the larva first breaks the egg-case, it is confined within a skin that encloses every part, each small cilia is bent, and every large one retracted within itself, like the draw-tubes of a telescope; this skin it shakes off within a few hours, or perhaps less. A few days and the process is again repeated, and probably, at intervals of about the same or a constantly increasing duration, is continued for some months. I say probably, because no effort has yet succeeded in keeping the larva through the earlier stages of its existence. The changes with each exuviation are very inconsiderable, but a certain amount takes place at every stage, and the animal loses the eccentric form of its youth and gradually acquires that of the parent crab. It is after it has arrived at the matured form that observers have been most successful in seeing the flaying process voluntarily carried on.

Réaumur was the first man who told us how it was done; he saw a river crayfish (*Astacus fluviatilis*), the *ecrevisse* of the French, struggle itself out of its skin. There is a charm about being the first to observe a fact; it is like starting in the race before one follows, and, starting first, keeps all others in the same line behind. Since Réaumur watched the crayfish, others have done the same as opportunity has occurred, and told us how the crab, the lobster, the shrimp, and the lower forms of Crustacea, free themselves from their coats. Couch, Gosse, Sir John Dalyell and Dr. James Salter have each written upon the subject, and I have watched them also. *Vide* An. Nat. Hist. 1849.

(To be continued.)

Notes on Spiders captured in 1860.

By the Rev. O. P.-Cambridge.

An excess of moisture seems to be less prejudicial to spider-life than an excess of drought; and again, moisture is less hurtful to spiders than to insects in general; and so, while last season was so barren a one to entomologists, I have but little reason to be dissatisfied with the results of my researches in Arachnology, having captured and observed fifty-four species that I had not seen before, besides discovering both sexes of several others of which only one sex had hitherto been discovered.

I have also several species yet under examination, which I believe will prove to be new to Science: of the fifty-four species mentioned ten are new to Science and eleven new to Britain, but known and described by continental arachnologists.

Although, however, I had such good reason to be satisfied with my success, that success was, I think, chiefly owing to the study of British spiders being even yet in its infancy, for I scarcely ever gave up an hour for a search, either in woodland or on the heath, that I did not turn up either something new or some species the knowledge of which hitherto rested on a solitary specimen or so; and I think this will be the case for some time, more especially in those parts of the kingdom yet unsearched. Little or nothing is yet known of Scotch spiders, and while Mr. Blackwall's beautiful work on British and Irish spiders (now being published by the Ray Society) is yet unfinished, it would add much to the completeness of the work if more could be ascertained relative to the Scotch species.

I should be glad myself to enter into correspondence with any Scotch entomologist on the subject of Arachnology, and to exchange English Lepidoptera, or spiders, for spiders captured north of Berwick-upon-Tweed. I shall also be most glad to name, as far as my knowledge of species will permit, any specimens either of English, Scotch or Irish spiders sent me by post for examination.

Spiders may be safely sent by post, placed in corked glass tubes, with a little spirit in each tube, the tubes being packed with wadding in a moderately strong wooden entomological post-box, or else in a tin wax vesta box. In hot weather the tubes should not have much spirit in them, as the expansion of it is apt to drive out the cork, or else more frequently to burst out the bottom of the tube. A good way to send a single tube is to cut a large wine cork in two lengthwise, and in the two halves to hollow out just sufficient to receive the tube without pressing upon it; the two parts being then tied together, with the tube inside, may be sent in an envelope, with or without a little wadding to steady it, to any part of the world, without damage: one tube will hold a number of specimens of small species, but a larger piece of cork, with two, three or more separate hollowings-out, might easily be made to transmit a large number of specimens, and this would be much lighter than a tin box and less liable to fracture than a wooden one.

I have now and at other times called special attention to the success I have hitherto met with, in hopes of inciting others to enter the field of Arachnology; but the question invariably asked me by those who write on the strength of promises of assistance is, "What work is there from which we may obtain the names of our captures, &c.?" I can now point to the work by Mr. Blackwall mentioned above as worthy of all commendation, both for the beauty of the plates (especially the minute accuracy of the palpi) and the accuracy of the descriptions; so that one great hindrance to the study is now in course of removal.

The early part of last season (April and May, 1860) promised to be unusually prolific in spiders; but the heavy rains and cold ungenial weather that set in early in June thinned the summer broods, and some species usually very abundant were quite scarce. The autumn was very barren in adults, and whole broods of young must have been destroyed by the continued rain and wind at the end of October, and as the progenitors of the next season's broods spring from those that hybernate and become adult early in the spring and summer, I think we may expect the next season to be a very barren one, whatever the weather may be, though if the early summer be fine and genial the autumn broods will probably regain their usual numbers.

The following list of my last year's captures may be considered as a further supplement to the lists in the 'Zoologist' (Zool. 6493, 6862). I have, though, noticed here afresh some few species already noticed in those lists; but where this is the case I have inserted a reference to the former notice.

The terms "common," "rare," &c., are used in the present list, as nearly as practicable, in the sense explained (Zool. 6893). All the species mentioned in the present list were captured by myself, except where stated otherwise.

Order ARANEIDEA.

Tribe OCTONOCULINA.— Family MYGALIDÆ.

Atypus Sulzeri, *Latreille* (see Zool. 6494). An immature female, taken from the bottom of its silken tube, dug out of the ground, in the Isle of Portland, in July, 1860.

Family LYCOSIDÆ.

Lycosa armillata, *Walck.* New to Britain. An adult male of this species taken running in the sunshine on Hursley Down, near Winchester, in May, 1860. It is allied to L. rapax, but easily distinguished by the gouty tibial joints of the first pair of legs, and it is much more clearly and distinctly marked, the contrast between the jet-black and pure white hairs on the cephalothorax and abdomen being very remarkable.

L. herbigrada, *Blackw.* (see Zool. 6495). Females of this very distinctly marked species had been taken before, but no males; in May and June, 1860, however, I found both sexes, adult, very common, but local, on heaths at Lyndhurst, Hants, and Bloxworth, Dorset. This species seems peculiar to heaths in the South of England, and rather local there; the ashy gray ground colour of it admirably adapts it to the spots where it delights to bask in the bright sunshine. It is a very active species, and captures its prey, small beetles especially, by fairly coursing them down. This is also the case with L. picta and L. andrenivora, which last in turn courses down L. herbigrada; I have seen several very exciting and amusing chases of the kind; L. herbigrada though generally manages, I suspect, to get away, owing to its great speed, unless caught at a meuse or surprised unawares, and if so, L. andrenivora being so far superior in size, the issue of the fight is not long doubtful. As far as my observations go, I do not think any Lycosa jumps on its prey, like the Salticidæ, but always seizes it in fair plain running, whether the prey is either running or stationary.

L. latitans, *Blackw.* Frequent in sloppy marshes near Bloxworth, Dorset. I have also found a few solitary specimens among damp moss on the lawn at Bloxworth Rectory, far removed from marshy ground. This well bears out Mr. Blackwall's observation ('History of British Spiders,' p. 34), "that it connects the purely terrestrial with the semi-aquatic Lycosæ;" it is adult in June.

L. piscatoria, *Koch.* Frequent in sloppy marshes, in company with L. latitans, and adult at the same time.

Dolomedes ornatus *Blackw.* (see Zool. 6495). Frequent, in May, 1860, on rushes and grass in bogs on Lyndhurst Heath, but none adult. I have a suspicion (shared in by Mr. Meade), that this will eventually prove to be only the immature state of D. fimbriatus.

Hecäerge spinimana, *Sundeval.* Not rare, Hursley and Bloxworth, among weeds and rubbish in hedges, and at the roots of heath; throughout the year.

Family SALTICIDÆ.

Salticus sparsus, *Blackw.* (Zool. 6495). Adults of both sexes, not rare, on walls of Red House, Hursley, end of May, 1860.

S. quinquepartitus, *Walck.* New as British. An adult male taken on Bloxworth Heath by myself, in July, 1860; and one received shortly after from Bournemouth, Hants, taken by O. H. Crewe, Esq.

S. grossipes, *Degeer*. New as British. An adult male on rushes in a bog near Lyndhurst, Hants, in May, 1860.

S. nidicolens, *Walck.* New as British. An immature female of this distinctly marked species on Bloxworth Heath, in September, 1860.

S. obscurus, *Blackw.* Adults of both sexes frequent on trees and bushes in woods at Lyndhurst and Bloxworth, throughout the summer of 1860; a single specimen of the male only hitherto known.

S. tardigradus, *Walck.* An adult female received for examination from Mr. W. C. Unwin, of Lewes, Sussex, in January, 1860, and an immature female taken by myself in a cleft of a wood paling at Calke Abbey, near Derby, in April, 1860.

S. distinctus, *Blackw.* Immature males and females taken under loose stones in garden wall at Hendre House, Llanrwst, in April.

Family THOMISIDÆ.

Thomisus clavatus, *Latreille* (Zool. 6863). Frequent, under detached pieces of rock in the Isle of Portland, July, 1860. Principally adult females with their egg-cocoons, each of which contained from five to seven eggs not agglutinated together. Like many other spiders the attachment of this species to its cocoon is very remarkable, though not perhaps so strong as with many of the Lycosidæ.

T. lanio, *Koch.* New as British. Males and females, adult, occasional, on oak underwood, near Lyndhurst, end of May, 1860.

T. pallidus, *Blackw.* An adult female on Lyndhurst Heath, under dry cowdung, in 1858. Hitherto mistaken, both by Mr. Meade and myself, for T. atomarius, the notice concerning which must therefore be struck out from Zool. 6493. An adult male, and several immature females, at Bloxworth in October, 1860. The adult male had been hitherto undiscovered.

T. floricolens, *Walck.* An adult male and several immature females, on Scotch firs, Lyndhurst, May, 1860; also immature females, occasional, on underwood, Bloxworth, July, 1860.

Philodromus dispar, *Walck.* (Zool. 6496). Males and females, adult and immature, at Hursley, Lyndhurst and Bloxworth, throughout the summer. It appears to arrive at the adult state in June and July, and is frequent on trees and bushes.

Sparassus smaragdulus, *Walck.* (Zool. 6497). I have never yet succeeded in capturing an adult male of this beautiful species, but males and females immature are occasional, on underwood, Bloxworth, in autumn.

Family Drassidæ.

Drassus sericeus, *Sundeval* (Zool. 6497). Rare, Hursley, in May, 1860, and Bloxworth, throughout the year.

D. lucifugus, *Walck.* (Zool. 6497). Males adult, and females immature, under stones and dry cowdung, Bloxworth Heath, July and August, 1860; rare.

D. pedestris, *Koch.* New as British. Not rare; males and females, adult and immature, under stones and rocks, Portland, July, 1860. This species is allied to D. ater, but the shortness of the hairs covering its abdomen, the tarsal, metatarsal and tibial joints of the legs, which in immature specimens are constantly pale whitish, and in mature specimens brownish red, besides the very different form and structure of the palpi and the colour of the plates of the spiracles, readily distinguish it from D. ater. It is an exceedingly nimble species.

D. pusillus, *Koch.* Male and female adult, among rubbish in hedge on Hursley Down, May, 1860.

D. prælongipes, *Cambridge.* New to Science. Rare; three adult males and an adult female, running on edge of bare spots on the heath, and at heath roots, Bloxworth, July, 1860; also an immature female, received about the same time, from Mr. C. H. Brown, Southport, Lancashire.

D. subniger, *Cambridge.* New to Science. An adult male, among rubbish in hedge on Hursley Down, May, 1860.

D. lapidicolens, *Walck.*, *Koch* (Zool. 6863). A male adult at Hursley, May, 1860; also males and females, adult and immature, common under stones, &c., Portland, June, 1860.

D. fulgens, *Walck.* New as British. A male adult and two immature females of this brilliant spider, under stones, Portland, July, 1860.

D. propinquus *Blackw.* (Zool. 6497). Rare, among dead rubbish in hedges, Hursley, May 1860, and at heath roots, Bloxworth; adults of both sexes common under stones, Portland, June, 1860.

Clubiona corticalis, *Walck.* (Zool. 6497). Immature specimens of both sexes frequent under bark on old decaying trees at Calke Abbey, near Derby, in April, 1860. An adult male received from the same locality in July, from the Rev. T. W. Huthwaite.

C. brevipes, *Blackw.* Rare, adult males on underwood, Lyndhurst and Bloxworth, May and June, 1860.

C. comta, *Koch* (Zool. 6497.) Frequent, on trees and bushes, Hursley, Lyndhurst and Bloxworth, throughout the summer. It is adult at the end of May.

C. accentuata, *Walck.* (Zool. 6497). Frequent in same situations and at the same time as C. comta. Adult in May and June.

C. domestica, *Wider.* (Zool. 6498). Occasional, under stones and pieces of rock, Portland, throughout the summer; females adult in July. I have never yet succeeded in obtaining a male.

Ciniflo ferox, *Koch* (Zool. 6864). Males adult, rare in outhouses, Tecknall, near Derby, in April, 1860; also one received from Mr. Wintle, of Gloucester, and several from Mr. Unwin, captured at Lewes, Sussex.

C. mordax, *Blackw.* (Zool. 6498). Several received from Mr. H. Rogers, of Freshwater, Isle of Wight. I feel certain that this is only a dark variety of C. ferox.

C. humilis, *Blackw.* Very common on furze bushes. Males and females adult, at Hursley, Lyndhurst and Bloxworth, in May and June, 1860.

Veleda lineata, *Blackw.* (Zool. 6498). Male and female, not quite adult, on heath, Lyndhurst, end of May, 1860.

Agelena elegans, *Blackw.* Several in a swamp near Hendre House, Llanrwst, April, 1860.

A. montana, *Blackw.* Occasional, under stones, Portland, October, 1860.

A. brunnea, *Blackw.* (Zool. 6498). Occasional at heath roots, Bloxworth, throughout the summer. Adult in September.

A. subfusca, *Cambridge.* New to Science. An adult male at Lyndhurst, May, 1860.

Tegenaria campestris, *Koch.* New as British. Two females, among rubbish in hedge, Hursley Down, May, 1860; several females adult, and males immature, among a heap of brickbats, in the interstices of which they had formed webs very similar to those of T. civilis, at Bloxworth Rectory, in June; and a male adult at heath roots, Bloxworth Heath, in October of the same year.

Cælotes saxatilis, *Blackw.* Not rare, under stones, near Calke Abbey, Derby; and at Hendre, near Llanrwst, April, 1860. The range of this spider does not appear, as yet, to extend further south than Derbyshire. I have met with it frequently at Brancepeth, near Durham, and also near Bradford, Yorkshire. It is adult in April and May.

Theridion stictum, *Cambridge.* New to Science. Two immature females under heathy ledge, Bloxworth, September, 1860.

T. sisyphum, *Walck.* (Zool. 6499). Very rare, Hursley, May, 1860. An adult female and her egg-cocoon in a web spun among wild honeysuckle by the side of the trunk of an oak, Bloxworth, July, 1860.

T. simile, *Walck.* New as British. Common on furze bushes, Hursley, May, 1860; also in woods, Bloxworth, in June.

T. carolinum, *Walck.* (Zool. 6864). Occasional, Hursley, Lyndhurst and Bloxworth, among rubbish in hedges and at heath roots, throughout the summer. The head quarters of this species, as far as I have yet observed it, seem to be at Southport, Lancashire, among dwarf willows, &c., on the sand hills.

T. guttatum, *Walck.* New as British. Two adult females and an immature male, among rubbish in a hedge, Hursley, in May, 1860. Males and females, adult and immature, at heath roots, Bloxworth, not rare.

T. pallens, *Blackw.* (Zool. 6864). Common on trees and bushes, Hursley, Lyndhurst and Bloxworth; adult males may occasionally be found on posts and palings in May. The species mentioned at Zool. 6499 as T. albens was mistaken by Mr. Meade and myself for that species, but is only T. pallens.

T. angulatum, *Blackw.* An adult male and two adult females, among rubbish in hedge, Hursley, May, 1860; an adult male on a thorn bush, Lyndhurst, in May; females and males immature among heath, Bloxworth, rare, October, 1860.

Theridion variegatum, *Walck.* (Zool. 6864). Occasional on furze bushes, among weeds and rubbish in hedges, and at heath roots, Bloxworth, 1860. I have never met with but one adult male.

T. signatum, *Walck.* (Zool. 6864). An immature male under a stone near Calke Abbey, Derbyshire, April, 1860.

T. filipes, *Blackw.* (Zool. 6499). Rare, Bloxworth, 1860; and Southport, 1859.

T. inornatum, *Cambridge.* New to Science. Males and females, adult and immature, under stones, Portland, October, 1859, and June and July, 1860, occasional; and also at heath roots, Bloxworth.

Family LINYPHIIDÆ.

Linyphia albula, *Cambridge.* New to Science. An adult female on a holly bush, Hursley, May, 1860.

L. cripticolens, *Walck.* An adult male in outhouse, Bloxworth Rectory, July, 1860.

L. frenata, *Wider.* Two adult females, among rubbish on heathy bank, Bloxworth, October, 1860.

L. Claytoniæ, *Blackw.* This species, which is synonymic with L. anthracina, is common on trees, bushes and heath, Bloxworth, in May, and again in August, September and October.

L. obscura, *Blackw.* An adult male received for examination in November, 1860, from Mr. Wintle, of Gloucester.

Neriëne munda, *Blackw.* Males and females, adult, Bloxworth, in summer of 1860. Also an adult male received from Lewes, from Mr. W. C. Unwin.

N. cornuta, *Blackw.* (Zool. 6500). Males and females, adult, not rare, on trees, and occasionally running on posts and palings, Bloxworth, in summer of 1860; also at Lyndhurst in May.

N. nigra, *Blackw.* An adult male and female under a stone at Calke Abbey, April.

N. graminicola, *Sundeval.* Males and females, adult, occasional, on underwood, Bloxworth, in summer of 1860.

N. variegata, *Blackw.* (Zool. 6500). Adults of both sexes common on furze bushes and among heath, Hursley, Bloxworth and Lyndhurst, in May, 1860.

N. Huthwaitii, *Cambridge.* New to Science. An adult male of this very distinct species sent me by the Rev. T. W. Huthwaite, who captured it at Calke Abbey, in July, 1860.

Walckenäera acuminata, *Blackw.* Adult females under stones in woods at Calke Abbey, and at Conway, in April, 1860; also one sent me for examination in January, 1860, by Mr. Unwin, captured at Lewes.

W. cuspidata, *Blackw.* Males and females adult, rare, in an outhouse, Ticknall, near Derby, April, 1860. The species mentioned at Zool. 6500 as W. cuspidata is W. monoceros (Zool. 6865).

W. unicornis, *Cambridge.* New to Science. Five males, adult, on bushes, Lyndhurst, May, 1860.

W. parallela, *Wider* (Zool. 6865). An adult male sent me from Brighton by F. Bond, Esq., April, 1860; one at Hursley, taken by myself, in May, and another on a wall at Wareham, Dorset, in July.

W. punctata, *Blackw.* Adult females, rare, on underwood, Lyndhurst, in May, and Bloxworth, in July.

W. flavipes, *Blackw.* Common on bushes in woods, Bloxworth; both sexes adult, in July.

W. hiemalis, *Blackw.* Males and females, adult, occasional, on trees and bushes, Lyndhurst, May.

W. bifrons, *Blackw.* Males and females, adult and immature, occasional, on juniper bushes, Hursley, in May; also an adult male at Bloxworth, in July.

W. depressa, *Blackw.* An adult male and several females, on underwood, Bloxworth, in the summer.

W. humilis, *Blackw.* Several adult males and an adult female, on furze bushes, Hursley, May.

W. pumila, *Blackw.* An adult male, on underwood, Bloxworth, July.

W. ludicra, *Cambridge.* New to Science. Common, both sexes adult, on furze bushes and among heath, at Hursley, Lyndhurst and Bloxworth, in April and May.

W. saxicola, *Cambridge.* New to Science. Two adult males and an adult female, under stones, Portland, July.

W. pratensis, *Blackw.* Males and females, adult, under banks of the Conway, at Hendre, North Wales, in April. Mr. Blackwall had before discovered the female, but the male was new to Science, and the species is yet undescribed.

Pachygnatha Clerckii, *Sundeval* (Zool. 6865). Males and females, adult, sent me from Calke Abbey by the Rev. T. W. Huthwaite, April.

Epëira solers, *Walck.* (Zool. 6500). Males and females, adult, frequent, on heath, Bloxworth and Lyndhurst, May and June; in October it is very common, but none adult.

E. acalypha, *Walck.* (Zool. 6500). Males and females, adult, common, on heath, Lyndhurst and Bloxworth, May and June. Adult males are less common than females.

E. adianta, *Walck.* (Zool. 6501). Frequent on heath and low furze bushes, Bloxworth, August. This species is adult in September and October; adult males are rare.

E. celata, *Blackw.* An immature female received from the Rev. T. W. Huthwaite, captured at Calke in October.

E. albimacula, *Blackw.* Frequent, both sexes, adult, on juniper bushes and hedges, Hursley Down, and on underwood, Bloxworth, May, June and July.

E. anthracina, *Koch.* New as British. Two adult males, on underwood, Lyndhurst, May.

E. conica, *Walck.* (Zool. 6501). Adult males very rare, Hursley, May.

E. tubulosa, *Walck.* (Zool. 6501). Male and females, adult, Lyndhurst Heath, end of May, rare.

E. calva, *Blackw.* (Zool. 6501). Male and females, adult, Lyndhurst Heath, end of May. An immature female, Bloxworth Heath, August.

E. Herii, *Koch.* (Zool. 6501). Males not quite adult, females adult, end of May, Lyndhurst Heath.

E. angulata, *Koch.* (Zool. 6501). Males and females, adult, Hursley and Lyndhurst, on furze bushes and underwood, end of May.

E. bella, *Meade.* New to Science. An immature male and several adult and immature females kindly sent me for my inspection, by R. H. Meade, Esq., who captured them in Buckinghamshire in the summer.

Tribe SENOCULINA.—Family DYSDERIDÆ.

Dysdera erythrina, *Walck.* (Zool. 6501). Very rare, under stones, Bloxworth Heath. This species seems to be almost exclusively a coast one, as it is very common under stones at Portland.

Segestria senoculata, *Walck.* (Zool. 6501). Frequent at Calke Abbey, under bark of decaying trees and under stones. Occasional at Portland, under stones; adult in May and June.

Oonops pulcher, *Templeton* (Zool. 6502). Occasional, under stones, Portland. One male adult, in October.

O. PICKARD-CAMBRIDGE.

Errata in previous Lists.—P. 6865, line 1, *for* Linyphia Fenella *read* Linyphia tenella. Same page, line 23, *for* Walckenäera fastigiata *read* Walckenäera fastigata. Same page, line 6 from bottom, *for* Hatta Wall *read* haw-haw Wall. P. 6893, line 17, *for* confused *read* confined. P. 6895, line 1, for the comma after "Natural History" place a full stop, and instead of the full stop after "classification" in line 2, place a comma. P. 6896, line 4, *for* cespiticola *read* cespiticolis. P. 6898, line 17, *for* Zool. 6700 *read* Zool. 6493.—*O. P.-C.*

The Economy of Limenitis Sibylla.—In July the pregnant female is seen hovering over the thickest parts of our taller copses, wherever the stems of the honeysuckle are imbedded, like petrified snakes, in the upright stems of the hazels, and the foliage of that sweet climber has surmounted the hazel spray, and its blossoms are gaping wide in the sunshine, and diffusing their delicate fragrance on the summer air. The actions and movements of a female butterfly when engaged in the maternal duty of oviposition is very different from her ordinary gait when sailing over the opening blossoms of the bramble in company with friends, lovers and kinsfolk. It is evident to the eye of the naturalist that she is now on weighty affairs of business; there is no time lost, none of those flirtations and love-chases so much admired and so glowingly described by our predecessors in the study of Entomology. Her flight is slow, flagging, flapping, and only from leaf to leaf. She selects with unerring discrimination the leaves of the honeysuckle, even when surrounded, and apparently half smothered with the foliage of the hazel, and lays a single egg on the upper surface of a leaf; she then flutters off to another, then to another, never tiring, never hesitating which leaf to choose, but always directed by an unfailing instinct to the honeysuckle, and always avoiding those leaves on which an egg has already been deposited. The egg is something the shape of an orange, only flatter at the poles, and has been compared to those sea-urchins or sea-hedgehogs which are found on the sea-beach, and are to be seen in the window of every shell shop. In fourteen days the little larva comes out of the egg-shell, and toddles to the very tip of the leaf before it begins eating, and then it nibbles away day after day, eating the green part, and leaving only the midrib sticking out like a bristle, and always after a good meal of leaf it goes to the very point of this bristle, and there rests while its meal digests and while it acquires strength for future attacks on the same leaf. Day after day the alternate processes of eating the leaf and resting on the tip of the bristle-like midrib continue, until three quarters or rather more of the leaf has been eaten, and then it knows that its devouring duties for the year are over. We all know that the leaves of the honeysuckle are deciduous, and, in the course of Nature, would fall off before winter; this, however, would not suit the requirings of the juvenile larva, which, having once fallen to the ground with the fallen leaf, would inevitably perish. To prevent this falling is absolutely necessary to the existence of the larva, and therefore to the preservation of the species; how then is this to be accomplished? The larva, by spinning a number of silken threads wound round and round the twig, and round and round the leaf-stalk, fastens the leaf-stalk to the twig to which it is still attached. The next process is to make a winter habitation of that portion of leaf that still remains uneaten; the corners of this uneaten portion are fastened tightly together, and then the edges are united, these operations being effected by means of silk spun from the mouth; the work is then finished, and the little caterpillar is thus laid up for winter quarters inside his hammock, the bristle-like midrib of the leaf curling over it like a tail. Now the process of fastening the leaf to the twig by silken cables has done nothing to prevent the natural dehiscence of the leaf-stalk at its base, so that this inevitable process takes place at the appointed time, and then the little cot, instead of standing erect, falls as far as the cables will permit, always less than half an inch, and rocks to and fro all the winter, lulling the infant larva to sleep, and keeping him asleep for six consecutive months; rain, snow, ice, wind, and all the vicissitudes of our winter, have no power to injure or even wake him; hung aloft in his little cradle he rocks in comfort and security, and rides out the roughest storm without a thought of harm. In April he wakes up, the same increase of temperature which poets tell us rouses "the torpid sap detruded to the roots,"—a very apocryphal doctrine by the way, as the change of temperature is more likely to be felt in the air than in the earth: however, the same change of temperature which compels the leaf-buds to burst, also resuscitates the little caterpillar; he wakes up, crawls out of his hammock, and commences operations on the expanding leaves. He now no longer confines himself to the tip of the leaf, but feeds away, with all the voracity which a winter's fast may be supposed to have engendered, during nearly the whole of April and May; and by the 1st of June is full fed, and then differs *in toto* from the imaginary larva of Limenitis Sibylla figured by Curtis, and described by our English authorities: he is of a pale green colour, with red-brown head, legs and spines, and a pure white streak on each side just above the claspers; this streak begins on the 6th segment and extends to the last pair of claspers; the head itself is beset with short sharp spines; there are two long and branched spines on the 2nd, 3rd, 5th, 11th and 12th segments, and two shorter ones on the 6th, 7th, 8th, 9th and 10th. About the 10th of June he suspends himself by the tail from the stem of the honeysuckle, and changes to a grotesquely-shaped chrysalis, which hangs head downwards, and seems to have two ears: the wing-cases and front of the head are dark green, the body yellow, and hind part of the thorax brown and curiously humped: viewed sideways this chrysalis rather resembles a very ugly mask, the humps representing a very prominent nose and chin. The butterfly is on the wing during July, and flies with such exceeding grace and elegance as to have attracted the notice of all lovers of Nature. We are told of an aged enthusiast in Entomology who, after gout or rheumatism had deprived him of the pleasure of pursuit on foot, used to take a post-chaise to Coombe Wood, in Surrey, to watch the flight of this elegant butterfly. A considerable portion of this life-history of Limenitis Sibylla has already been published in my Natural History of British Butterflies, but the wonderful history of its hybernation was discovered by Dr. Maclean, of Colchester, and kindly communicated to me by that prince of entomological observers, who also favoured Dr. Bree with the particulars, with permission to use them in his work intituled 'Species not Transmutable.'—*Edward Newman.*

Occurrence of Zygæna Achilleæ in Ireland.—It is a dangerous thing to write about our British Zygænæ: if any one incline to take up the genus I heartily wish him well through it. It is an equally dangerous thing to introduce a new species on the faith of a single specimen; but I will risk both these dangers. About a month since Mr. Birchall sent me a single specimen of a Zygæna taken by himself in the West of Ireland. I could not make it out, as it presented a combination of characters which do not exist in any other species. After a while I submitted it to Mr. Doubleday, who pronounced no opinion, but, with his invariable promptitude and kindness, sent me a pair of continental specimens of Zygæna Achilleæ, for the purpose of comparison; and the new comer proved to be identical with that continental species. It may at once be distinguished from every species yet discovered in this kingdom, save and except Z. Minos, by the extreme bluntness and capitate form of the antennæ; and from Z. Minos it is instantly distinguishable by the texture and colour of the covering of the body: in Z. Minos this covering is long, shaggy and dead black; in Z. Achilleæ it is close, compact, shining, and chalybeous-blue. On the Continent this species occurs more particularly on chalky soils, but I am not aware of the existence of chalk in the vicinity of its Irish habitat. I forbear describing the colour of the wings, as the species seems subject to much variation in this respect.—*Id.*

Description of the Larva of Mæsia belgiaria. — Rolls itself in a ring, and falls off its food when handled or annoyed, and will remain in this position for an hour without moving. Form uniformly cylindrical, with two small warts placed transversely on the back of each segment; a conspicuous conical horn on the 12th segment; and a pair of slender, pointed, closely approximate horns, pointing backwards, on the 13th. Colour brown, variegated, mottled and streaked with gray; on the anterior pair of claspers is a white stripe, and a faint appearance of a similar stripe on the posterior pair. The colour of this larva is very plain and obscure; the Sphinx-like dorsal horn and the two anal horns are very distinctive. Feeds on Calluna vulgaris (common ling), on which the egg is laid in June; it hybernates very early in the autumn, and, beginning to feed in April, grows rapidly, and is full fed about the 1st of May, when it spins a slight cocoon on the ground, and there changes to a pupa, and to a perfect

insect about the end of May. The first of the moths emerged, in confinement, on the 20th of May. I am indebted to Mr. Thomas Huckett for the loan of this larva.—*Edward Newman.*

Notes on new or little known British Eupitheciæ. By HENRY DOUBLEDAY, Esq. *The Descriptions of the Larvæ by the* Rev. H. HARPUR CREWE, M.A.

A FEW weeks since I forwarded specimens of most of our Eupitheciæ to Dr. Herrich-Schæffer, and he has kindly sent me some observations upon them which will probably be interesting to the readers of the 'Zoologist.'

Eupithecia affinitata. "New species, which has not been found in Germany."

E. expallidata. "Also new to me, and unknown in Germany."

E. absynthiata. "Your specimens differ a little from ours. Feeds upon Senecio Jacobeæ, Artemisia vulgaris and Solidago virgaureæ."

E. abbreviata. "Rare with us, and sometimes confounded with E. dodoneata. A good species."

E. subfulvata. "Appears to me different from our varieties of E. succenturiata, of which I will send you specimens."

E. denotata, *Guenée.* "This is the true E. pimpinellata of Hübner without doubt." (I have always thought that this species was the true E. pimpinellata of Hübner, and my friend M. Guenée is now of the same opinion, but it seems probable that E. denotata is only a variety of the same species, and therefore this name must sink altogether.—*H. D.*)

E. pimpinellata, *Guen.* "Not found in Germany, and new to me. The name must be changed." (I have proposed to call this species E. virgaureata, and M. Guenée considers the name very appropriate, and will adopt it for this species in the appendix to his work.—*H. D.*)

E. pimpinellata, *var. A., Guen.* "This is my E. tripunctata. The name albipunctata has been employed by Hufnagle. (It is impossible to say whether Haworth described this species or E. satyrata under the name of albipunctata, and therefore Dr. Herrich-Schæffer's name must be adopted. The Rev. H. Harpur Crewe, who has done more than any other entomologist to elucidate the history of this interesting genus, first clearly proved that the last two species are truly distinct.—*H. D.*)

E. constrictata, *Guen.* "This is my E. distinctaria." (Dr. Herrich-Schæffer's name being the older of the two must be adopted.—*H. D.*)

No. 22, ——— ? (The species which I sent under this number was taken on the cliffs near Dover, by Mr. Grant and Mr. S. Stevens, some years since. Guenée thought it might be a variety of E. sobrinata, but Dr. Herrich-Schæffer thinks it will prove a distinct species: till more is known of its history nothing can be affirmed with any certainty about it.—*H. D.*)

No. 27, ——— ? "This is my E. trisignaria. The larvæ are found with us upon Heracleum spondylium, in July and August." (The Rev. Joseph Greene discovered the larva of this species upon an allied plant, Angelica sylvestris, in a damp wood. The perfect insect is very dull-coloured, but quite distinct from any other species. It is new to this country.—*H. D.*)

E. Haworthiata. "This is a good species, and the E. isogrammata of Treitschke, and is rare with us." (Of course my name must sink.— —*H. D.*)

E. pulchellata. "A good species, not found in Germany."

Of the other species sent there is nothing to remark.

I sent a few Tortrices with the Eupitheciæ; among them two species of Catoptria. One of these, which has been called C. modestana in this country, is C. æmulana, *Schlg.*; the other C. conterminana, *H.-S.*

HENRY DOUBLEDAY.

Epping, May 6, 1861.

Description of the Larva of Eupithecia tripunctata, H.-S.—*Var.* 1—Ground colour pale lemon-yellow, more or less suffused with rich brown. Down the centre of the back a series of deep brown lily-shaped spots, bordered on either side by a slender subdorsal line of the same colour. On each side a row of slanting bright yellow stripes and deep brown blotches. Belly greenish yellow. Central ventral line deep brown. Subventral line deep brown, much broader than the central one. Body studded with numerous small white tubercles.

Var. 2.—Ground colour pale yellowish green. Down the centre of back a series of semi lozenge-shaped dusky brown spots, connected by a central line of the same colour, and becoming indistinct on the posterior and confluent on the anterior segments. Subdorsal lines dusky, indistinct. On each side a series of dusky blotches. Central ventral line dusky, interrupted. Whole body, especially back, studded with minute white tubercles and a few short blackish hairs. The dorsal, subdorsal and lateral blotches, spots and lines, are sometimes almost or entirely wanting, leaving the larva a uniform pale yellowish green.

This larva very strongly resembles that of E. satyrata in form and appearance, but is less robust. It tapers towards the head, and has a slightly wrinkled appearance. When full fed and ready to spin up it turns pink. Pupa enclosed in a slight earthen cocoon. Thorax yellowish green, wing-cases dark green, furrowed and wrinkled. Abdomen tapering, rough, dull red. A slight ventral protuberance.

I have for the last four or five years been in the habit of taking this larva and breeding the perfect insect, which from the first I recognised to be quite distinct from all our previously known British species.

After much delay I have at last, through the kindness of Mr. Doubleday and M. Herrich-Schæffer, succeeded in getting it named. The larva appears to be totally unknown on the Continent. It feeds in September, in damp woods, on the flowers and seeds of Angelica sylvestris, and occasionally upon late flowers of Heracleum sphondylium. I have taken it in Suffolk, Kent and Derbyshire. The perfect insect appears in May and June. The larva is uncertain in its appearance. In 1859 it was by no means uncommon; in 1860 it seemed to have entirely disappeared. It is frightfully infested by ichneumons, and not above one in ten or twenty escapes.

Description of the Larva of Eupithecia trisignata, H.-S.—Rather short and stout, tapering but slightly towards the head. Ground colour pale green. Central dorsal and subdorsal lines dark green, latter broader than the former. Spiracular line waved, whitish. Segmental divisions yellowish. Head black when at rest, curved considerably inwards. Anal tip of central dorsal line purplish. Back wrinkled, sprinkled with a few very short bristly hairs. Belly green, with a central yellowish line. Pupa enclosed in an earthen cocoon. Thorax pale olive. Wing-cases pale olive, very transparent. Abdomen tapering, reddish yellow; tip and divisions blood-red.

Two years ago Mr. Greene and I were searching for larvæ of E. tripunctata in Derbyshire, when I stumbled upon two larvæ which I at once saw were those of no British Eupithecia I had ever yet seen, their black heads giving them a most distinct appearance. Mr. Greene was afterwards fortunate enough to meet with more, and from them we bred what turned out to be E. trisignata, *H.-S.* The larva feeds in September on flowers and seeds of Angelica sylvestris, in company with, and in similar situations to, E. tripunctata. Mr. Greene and I have only met with it in Derbyshire. In Switzerland it feeds on flowers of Heracleum sphondylium. The perfect insect appears in June and July.

H. Harpur Crewe.

Rectory, Drayton Beauchamp,
near Tring, May 6, 1861.

Capture of Notodonta carmelita near Cockermouth.—My brother, I. S. Mawson, in the month of April last, captured near Keswick eight splendid specimens of Notodonta Carmelita. Three specimens are in the cabinets of Messrs. Tiltman and Nicholson, of Whitehaven, one in the cabinet of Mr. John Walker, of Cockermouth, the rest grace my own cabinet. He has also taken near the same place Ceropacha ridens dark variety, (1), C. flavicornis (2), Biston prodromaria (5), and several Acasis viretaria. I have sent this note thinking that the above captures, especially those of N. Carmelita, might be worth recording in the 'Zoologist,' as I believe it is now some years since that insect has been taken in the same locality, and never before in so large a number by one person near here.—*George Mawson ; Gill House, Cockermouth, May* 20, 1861.

Description of the Larva of Triphæna fimbria.— Rolls in a ring when touched, feigning death and falling off its food-plant. Smooth, cylindrical, gradually diminishing in size from the 12th segment towards the head, which is remarkably small for the size of the larva. Head shining, clay-brown, mottled and reticulated with darker brown : body clay-brown, mottled, velvety ; the 2nd segment has three narrow longitudinal pale lines ; on each side of each segment there is an indistinct oblique pale stripe ; along the back are a median series of obscure darker marks, seated in the interstices of the segments ; spiracles pale, each seated in a dark brown mark ; on the 12th segment a pale and a dark transverse mark ; belly, legs and claspers paler than the back. The egg of this beautiful moth is laid on Betula alba (birch) and Salix capræa (sallow) and several other trees early in the autumn, and the young larva remains on the tree until the approach of winter, when it descends to the ground and hybernates. In the spring it ascends the trunk every night as soon as it is dark, and devours the newly expanded leaves, then very small, again retiring to the ground before the approach of daylight. It is generally full fed before the middle of May, when it finally changes to a pupa on the surface of the ground. When full fed it is very conspicuous on the almost naked twigs of the birch, and is readily procured by collectors who seek it by lamp-light. I am indebted to Mr. Thomas Huckett for this and the two following larvæ.—*Edward Newman.*

Description of the Larva of Agrotis agathina.—Does not roll itself in a ring when touched, but falls off its food, and, bending its body slightly at both extremities, remains motionless a short time, feigning death. In form almost uniformly cylindrical, but slightly decreasing in size at either end, smooth and velvety : the head rather small and very shining pale dull green or dull brown, with two obscure longitudinal darker markings : body of different ground colour in different individuals, the prevailing hues green and brown, in all instances adorned with five longitudinal white stripes, all of which are more or less interrupted by folds in the skin, especially at the interstices of the segments ; three of these are brighter and more distinct than the remaining two, and may be called dorsal, the remaining two are lateral, and are tinged more or less with the ground colour of the body : the median stripe is found, on close examination, to be composed of a series of shuttle-shaped markings placed end to end; the next stripe on each side is bordered on its upper or dorsal margin with velvety black, massed on each segment into a conspicuous blotch; the lower margin is also bordered, but less conspicuously, with black; the lateral stripe is broader and more diffuse, as well as less conspicuous, than the others; it encloses the spiracles, which are ranged just within its upper margin, excepting the last and last but one, which are placed above the stripe: by these five stripes the dorsal surface of the body is divided into four nearly equal compartments, all of which are alike in ground colour, whatever its tint, and are delicately mottled with velvety black; the under surface bordering the lateral stripe partakes of the same colour, but the belly, as well as the legs and claspers, are paler, having a semi-transparent appearance. Feeds on Calluna vulgaris (the common ling) principally at night, when it is swept off the ling in early spring by collectors who are acquainted with its habits; it is full fed about the end of May. The perfect insect appears in autumn, as soon as the food-plant is in full flower, more especially selecting such plants as grow beneath the shelter of trees. Mr. Morris informs me that he finds it at Wickham, under the shelter of fir trees.—*Edward Newman.*

Description of the Larva of Agrotis porphyrea.—Uniformly cylindrical. Head very shining, pale brown: body umber-brown, paler between the segments: on the back are three series of linear clearly defined whitish marks placed end to end; the first series is median, and extends from the 3rd to the 10th segment, both inclusive, consisting therefore of nine spots; the first of these, that on the 3rd segment, is circular, that on the 4th oval, the rest linear; on each side of this series is a lateral series of similar whitish linear spots, and these commence on the 5th segment, and extend to the 13th; below these lateral series of whitish spots there is a whitish stripe which includes the spiracles, which are black; legs very shining, pale brown, spotted with black: claspers pale. Feeds on Calluna vulgaris (the common ling), only in the night. The eggs are laid and hatched in the autumn, and the larva hybernates: in April it begins to feed again and is full-fed in May; it then spins a slight cocoon on the surface of the ground, and therein changes to a pupa. The perfect insect appears about midsummer.—*Id.*

Description of the Larva of Agrotis lucernea.—Rolls in a ring when touched feigning death and falling off its food-plant. In shape almost uniformly cylindrical: surface smooth, velvety: head shining, the triangular plate intensely black; the hemispheres mottled with black and gray-brown: the colour of the body is a mottled mixture of gray-brown and black-brown, the darker colour assuming somewhat the form of a double series of V-shaped markings along the back, the apices of the Vs directed towards the head; the space within each V only a shade paler than the V itself, but terminating at its point in a very decided pale spot, which has a black dot in the middle, the dot emitting a black bristle: the legs black and shining; the claspers pale; the spiracles almost white, but surrounded by a black space. In confinement these larvæ, for which and those of the species which immediately follows I am indebted to Mr. Greening, of Warrington, fed voraciously by night on the leaves of Campanula rotundifolia (common harebell), but concealed themselves in peat earth by day: they were full fed and finally buried themselves on the 1st of May.—*Id.*

Description of the Larva of Agrotis Ashworthii.—Rolls in a compact ring, feigning death and falling off its food-plant when touched. In shape almost uniformly cylindrical, quite smooth and velvety: head bright red and shining: body uniformly coloured; generally smoky green; in some specimens olive-green, in others smokecoloured, with scarcely a perceptible shade of green: on the dorsal surface of each segment are two somewhat distant conspicuous markings of an intense velvety black: the figure of each of these markings is that of a longitudinally elongated square or parallellopipedon, its limits always clearly defined but not very regular; near the head these markings become narrower or more linear, and the pair on the 12th segment are also narrow and placed obliquely: the legs are red-brown and very shining. These larvæ feed on Festuca ovina, several species of Hieracium, Cistus Helianthemum, Thymus Serpyllum (wild thyme), Scabiosa succisa, Solidago Virgaurea (golden rod), Poterium Sanguisorba (burnet), &c.; and in confinement revel on Salix caprea (sallow), especially the catkins. They feed by night only, and bury themselves in the earth by day. They were full fed and finally disappeared beneath the earth on the 8th of May.—*Edward Newman.*

Life-Histories of Sawflies, translated from the Dutch of M. Snellen Van Vollenhoven. By J. W. May, Esq.

Nematus hortensis, *Hartig.*

Imago: *Hartig. Blatt. und Holzwespen,* No. 24, p. 127.

Larva undescribed.

Nematus luteus, antennis, cervice, thoracis dorso plus minus, segmentorum abdominalium linea aut macula trigona nigris, pedum posteriorum tibiis tarsisque fuscis.

In the first week of September I found some tenthredinidous larvæ of various sizes, in my garden at Leyden, feeding on Robinia pseudacacia, commonly called Acacia. It seemed to me singular that they should be feeding on the leaves of this foreign tree, and which I had not hitherto observed to be attacked by any species of insect, but the comparatively large number of larvæ which I found together (I counted fourteen), and the small size of the majority, contradicted the supposition that they had accidentally wandered from some other tree or shrub on to this one; moreover I was unable to detect any similar larvæ on other plants in the neighbourhood.

The largest somewhat resembled in form and colour the larvæ of the preceding species,* but on examination several points of difference were observable. They had twenty legs, the same as the last; they were also of a pale green colour, with a brown head, but this latter was of a lighter tint; there was no black dorsal stripe; spots on the side were scarcely discernible, and the supra-anal horns were not pointed as in N. cæruleocarpus, but consisted of two flat vertical wedge-shaped yellow projections with brown markings (fig. 3).

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* N. cæruleocarpus.

The youngest larvæ ate irregular holes in the middle of the leaves, the more advanced ate from the margin of the leaf towards the midrib, which was at last the only part of the leaf left. The head (figs. 1 and 2) was of a greenish pale brown colour, with a transverse and a longitudinal stripe over the crown, both of an ochreous-brown; the jaws were of a colour resembling burnt ochre, the eyes were seated in round black spots; some small gray hairs projected upwards from the head; the skin of the body was deeply wrinkled, shining, pale green, and appeared as if transparent, so that the white tracheæ were clearly visible on both sides; the spiracles had green margins. The six thoracic legs were glassy green; the twelve abdominal, as also the two anal prolegs, of the same colour as the body. The hind pair of thoracic legs were generally retracted, and not resting on the leaf; the last pair of abdominal legs were also often withdrawn under the skin, as I have endeavoured to represent in fig. 2. On the last segment of the body were observed the above-mentioned yellow projections with brown margins; this segment was also covered with short white hairs. As the larvæ had but just moulted, and acquired a new skin, the head, as well as the body and the anal horns, were pale green and shining; before they took to the earth my larvæ assumed a darker tint, and the green began to pass into brown. Their greatest length was 7½ lines, and the breadth 1 line.

From about the 17th to the 20th of September these larvæ crept into the earth, which I had given them for the purpose, and spun themselves simple brownish black cocoons, which it is unnecessary to figure. On the 25th of September I found three perfect insects had made their appearance. On the 1st of October two others appeared, and on the 2nd I counted two more. They were all females. The remainder died in the larva state, or were found dried up in the cocoons.

This Nematus is by no means a rare insect, and appears to occur in various parts of the country. Although I have never met again with the larvæ, and thus have never bred any males, I have no doubt that the male insect I am about to describe belongs to this species, since I have frequently taken it in gardens in company with the female. The perfect insects are from 2½ to three 3 long, and have an expansion of 6 lines, the males being smaller than the females. They belong to that division of the Nemati which have the anterior portion of the anal cell*

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* The sawflies are distinguished from all other Hymenoptera by the anal cell being divided longitudinally into two parts; to the anterior of these Hartig has given the name of Area lanceolata, in which he is followed by the author of these descriptions.

petiolated, and the first joint of the hinder tarsi but slightly expanded. The head is pale ochreous-yellow; the eyes black, and a black spot on the crown of the head, in which spot are found the ruby-coloured ocelli; the size of this mark varies in different individuals. The mandibles are brown; the antennæ black. The under side of body is ochreous-yellow, with the exception of two small black spots on the sides beneath the wings; the dorsum is a mixture of yellow and black. On the thorax, the greater part of the central lobe and the two lateral lobes, as also the metathorax, with the exception of the post-scutellum, are black, and on each segment of the abdomen is a shining, black, transverse band (fig. 4). In the male the black colouring is more diffused, so that both the scutellum and post-scutellum are frequently black. In this sex also the bands on the abdomen present themselves as black triangular marks, having the apices in the direction of the terminal segment (fig. 5). The first segment of the abdomen in the male is excised or notched, so that there is a triangular opening between the corneous integument of that segment and that of the second, which opening is filled in with a white membrane.

The legs are yellow in both sexes, with light brown tarsi on the first and second pairs, and light or sometimes dark brown tibiæ and tarsi on the posterior; in the males these tibiæ are sometimes yellow on the under side. The borer of the female is black, and projects somewhat beyond the abdomen. Viewed under the microscope the saw appears very simple, having a curved back and a straight edge with irregular teeth projecting in a backward direction, and which do not greatly exceed fifteen in number. The ovipositor is curved, and shuts with its concavity on the rounded back of the saw; its shape can be seen in fig. 6, that of the saw in fig. 7.

I am unable to say anything respecting the egg or the manner of ovipositing. I have no doubt this sawfly has more than one brood in the year; I observed a second generation in the month of July at Brummen, and believe in the possibility of a third.

I thought it as well to retain our term, anal, for the whole cell, and to designate Hartig's Area lanceolata as the anterior portion of the anal cell, leaving the remainder to be spoken of as the posterior portion. The German author employs the different forms assumed by this anterior portion of the anal cell (which are very constant) to separate the genera of Tenthredonidæ into groups. See Hartig's 'Holz-und Blattwespen,' pp. 25 and 40; and for the figures of the various forms of the cells, tab. ii. figs. 32 to 37.—*J. W. M.*

Strange Habits of Bees in Peru. — Mr. Sandison, son of the Rev. Mr. Sandison of this place, sends the following interesting fact in Natural History from Arequiperu, Peru: — "A few years ago a German got out a few hives of bees, an insect formerly unknown here. The first year he obtained a plentiful supply of honey, but year by year it decreased, until now the animals will hardly collect any. And why? Our climate is so equable that flowers can be had all the year round; and the sagacious animals, having discovered this fact, have evidently lost the instinct of hoarding honey for a winter that never comes."—*Brechin Advertiser.*

*Agricultural Ants.** — The first letter was dated Long Point, Texas, December 29, 1860. The species of Formica which Mr. Lincecum named "agricultural" was stated to be a large brownish red ant, dwelling in paved cities, a farmer, thrifty and healthy, and diligent and thoughtful, making suitable and timely arrangements for the changing seasons. When he selects a situation upon which to locate a city, if on ordinarily dry land he bores a hole, and surrounds it with a low circular mound three or sometimes six inches high, its outer limits three to four feet from the entrance. But if the location is on low flat land liable to inundation, though the ground may be perfectly dry when he does the work, he elevates his mound in a sharp cone to the height of fifteen or twenty inches, sometimes even more, and places the entrance near the apex. Around this he clears the ground of all obstacles, and levels and smooths the surface to the distance of three or four feet from the gate of the city. On this space not a spire of any green thing is permitted to grow, except a single species of grain-bearing grass, which, having planted, he nurses and cultivates with constant care, cutting away all other grasses and weeds that may spring up. The cultivated grass grows luxuriantly, producing a heavy crop of small white flinty seeds, which under the microscope very much resembles the rice of commerce. When it gets ripe it is carefully harvested and carried by the workers, chaff and all, into the granary cells, where it is divested of the chaff and packed away, the chaff being taken out and thrown beyond the limits of the cleared space. In wet weather these stores are liable to become damp, and to sprout and spoil; and if this occurs they bring them out to dry on the first fair day, carrying back all the sound seeds, and leaving the sprouted ones to waste. Mr. Lincecum stated that in the sand beds overlying portions of rock in his peach orchard there were five cities of these agricultural ants—evidently quite ancient cities—which he had observed for twelve years. The cities were invariably planted at the proper season with ant rice, and it was accordingly seen springing up in the farm circle every year about the 1st of November. He maintained that there can be no doubt of the fact that the peculiar grain-bearing grass was intentionally planted. In a subsequent letter, dated March 4, 1861, replying to this question from Mr. Darwin: "Do you suppose the ants plant seeds for the ensuing crop?" Mr. Lincecum replies: — "I have not the slightest doubt of it. I have at all seasons watched the same ant cities during the last twelve years. I visited the same cities yesterday, and found the crop of ant rice growing finely, exhibiting the signs of high cultivation." "We have," he continues, "not only agricultural ants in Texas, but a species that is a regular horticulturist. These plant with shade-trees the mounds of sand thrown out from their cells and extensive tunnels. They cannot stand our summer sun, nor travel over the unshaded plains to bring in provision, and hence the necessity of tunnels or under-ground passages to the trees and patches of herbaceous plants that yield the leaves upon which they subsist. The excavations sometimes extend outwards 400 or 500 yards. To allow sufficient space for carrying a piece of leaf through it as wide as a dime, or sometimes larger, the tunnel is generally an inch in diameter, terminating most commonly under a shady tree, or in a garden or corn field. When they enter a garden in this way they seldom fail to ruin it, all kinds of fruit trees, flowering shrubs and garden vegetables being trimmed of their leaves."—*Report of Linnean Society's Proceedings, in 'Gardeners' Chronicle,' May* 18, 1861.

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* Extracts from letters addressed by Gideon Lincecum, Esq., to Charles Darwin, Esq., on the habit of the agricultural ant of Texas.

Proceedings of Societies.

ENTOMOLOGICAL SOCIETY.

May 6, 1861.—J. W. DOUGLAS, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the respective donors:—'Transactions of the Linnean Society,' Vol. xxiii. Part 1; presented by the Society. 'Proceedings of the Royal Society,' Vol. xi. No. 43; by the Zoological Society. 'Proceedings of the Society, Part 3, 1860; by the Society. 'Observations on the Neuration of the Hind Wings of Hymenopterous Insects, and on the Hooks which join the Fore and Hind Wings together in Flight,' by Miss Staveley; by the Author. The 'Zoologist' for May; by the Editor. 'Notes on the Generative Organs, and on the Formation of the Egg, in the Annulosa,' Part 1, by John Lubbock, Esq., F.R.S.; by the Author. 'The Journal of the Society of Arts' for April; by the Society. 'The Athenæum' for March and April; by the Editor. 'The Entomologist's Weekly Intelligencer,' Vol. ix. and Nos. 235 to 239 inclusive; by H. T. Stainton, Esq.

Elections.

A. Murray, Esq., of Scotland Street, Edinburgh, was elected a Member; and James Arthur Laing, Esq., of Paragon Road, Blackheath, was elected a Subscriber to the Society.

Exhibitions.

Mr. Stevens exhibited some specimens of Saperda oculata from the Cambridgeshire fens, and observed that the species had not previously been taken in this country for about twenty years. He also exhibited two beautiful Cetonidæ, *viz.*, Tmesorrhina Thoreyi and T. Iris, from Sierra Leone; and three fine species of Paussus, from the coast of Malabar.

Dr. Wallace exhibited a specimen of Acherontia Lethe, said to have been found alive by a young lady at East Cowes. Being a native of the East Indies, it must have been accidentally imported into this country.

Mr. Haward exhibited a fine example of Euryporus picipes, found under decaying leaves on Sanderstead Downs.

Mr. Machin exhibited some interesting Micro-Lepidoptera, amongst which were Stigmonota interruptana, Coleophora vulneraria, an apparently new species of Gelechia, &c.

Mr. Stainton exhibited larvæ of two species of Micropteryx mining in birch-leaves.

He remarked that they were perfectly apodal, tapering towards the tail. The mine, a first a slender gallery, eventually became a large blotch, in which the excremen assumed the peculiar appearance of a coil of black thread. These larvæ had ofte before been observed by Mr. Stainton and other Micro-Lepidopterists, but had alway been neglected by them under the idea that they were Coleopterous.

In reply to a question from Mr. Westwood, Mr. Stainton stated that the Lepidopterous larvæ to which these were most nearly related were those of the genu Antispila.

Improved Breeding-cage.

Dr. Knaggs brought for exhibition one of the cages which he used for rearing th larvæ of Lepidoptera. It consisted of a glass cylinder, covered at its upper apertur with muslin fastened by twine or thread, in preference to elastic India-rubber rings which are apt to break from dampness or long-continued contact with another surface; of an unglazed earthenware plate, with a perforation in the centre of sufficien size to admit of the food-plant being dragged through, so as entirely to block it up twigs, &c., requiring to have a strip of linen twisted round them before they are passed through the opening; and of a jam-pot or other receptacle for water.

In his opinion there were many advantages over any breeding-cage he had hitherto seen or heard of, of which the absence of putrid water, which must always occur where damp sand is used, was the most important; dead larvæ, frass, &c., could be at once removed; there was a good footing on the unglazed plate, on which larvæ could not only crawl with ease, but could not become entangled, as to their legs, with webs, grains of sand (damp or dry), or cotton wool; by simply lifting cage, larvæ, food and all, from the water, the ends of the plants might be clipped off with a pair of scissors, and the cage placed into another jam-pot of pure water; and he suggested that if this were done about every other day the food would keep perfectly fresh for at least a fortnight; in fact, although the plant obtains the amount of moisture it requires, the cage remains dry. Amongst other advantages may be mentioned facility for the observation of larval habits; great economy of time and labour; great economy in price, thereby allowing a far larger number of cages for the same expenditure, so that species, and even individuals when necessary, may be kept separate; cleanliness, free access of air and light, &c.

On the score of economy he strongly recommended them; the cylinders, being the cut-off bottoms of glass shades, were of course next to unsaleable articles, so that, at any rate at present, they might be obtained for a sum varying from a penny to a shilling, according to size.

With regard to the unglazed plates (the ordinary state in which stock is kept), they might be got from the manufacturers; he would advise, however, that those of the best make should be procured, as being flatter; ingenuity would soon make holes in them, which might be done either by a drill or by a stock and countersink. The prices he paid for the best unglazed plates vary from 1*s*. 6*d*. to 2*s*. 6*d*. per dozen, according to size.

The following papers were read by the Secretary:—

"Notes on the Distribution of Insects in the Channel Islands," by F. Walker, Esq

"On the Euphorbia-infesting Coleoptera of the Canary Islands," by T. V. Wollaston, Esq.—*E. S.*